

## Effect of steaming-up-period on subsequent production in primiparous crossbred dairy cows

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### ABSTRACT

An experiment was carried out on 36 crossbred (Jersey, Holstein-Friesian and Hariana) pregnant heifers maintained under loose housing and group management systems for 90, 60 and 30 days prepartum till 150 days of ensuing lactation. The animals were selected on the basis of similarity in age and body weight. Over and above the scheduled amount of concentrate (@ 215 kg/animal/day), all the 36 experimental animals in 3 groups were offered additional 60 kg concentrate at different duration viz. @ 0.5 kg/day during seventh and eighth month of pregnancy followed by @ 1 kg/day during ninth month of pregnancy in first group; @ 1 kg/day for last 60 days of pregnancy in second group and @ 2 kg/day in last 30 days of pregnancy in third group. After calving, the animals were fed according to the milk yield i.e. 2 kg concentrate for maintenance plus 1 kg for every 2.5 kg milk production. *Ad lib.* green fodder and fresh water were provided throughout 24 hr. It was observed that although there were no significant differences between 3 feeding groups, 90 days feeding group animals performed better than other 2 groups in terms of 150 days subsequent milk production, time taken to attain peak yield, peak yield and 150 days yield of milk fat, SNF, protein and casein. Thus, 90 days feeding period may be recommended for better production, performance of animals in the subsequent lactation.

**Key words:** Cows, Primiparous, Production, Steaming-up-period

The efficiency of nutrient utilization throughout the pregnancy is different. During late pregnancy particularly heifers require maximum nutrient to grow her own body, to grow foetus, to promote the growth of mammary gland and to increase the body reserve for decreasing production stress during early lactation. Along with green fodder, extra concentrate feeding during last trimester of pregnancy or steaming-up is necessary for increasing milk production (Schwark *et al.* 1971, Kale 1984, Slobodyanik 1986, Saun *et al.* 1996 and Mantysaari *et al.* 1999), higher peak yield (Land and Leaver 1981), higher fat yield (Foot *et al.* 1963, Davenport and Rakes 1969, Strickland and Broster 1981 and Usmani and Inskip 1989). But costly concentrate must be

fed in such a way to obtain maximum production from animals. Although lot of research work have been done to see the effect of different level of concentrate feeding in a particular prepartum period (Kale 1984 and Slobodyanik 1986), very limited researcher (Foley *et al.* 1972) had studied the effect on subsequent production by offering the same extra amount of concentrate at different prepartum periods. Few workers did not obtain any effect of extra prepartum concentrate feeding on milk fat (Schmidt and Schultz 1959, Broster and Tuck 1967 and Spiekers *et al.* 1991), SNF yield (Broster *et al.* 1978 and Bezenko and Kalinin 1985). The objective of the study was to point out the effect of steaming-up-period on subsequent production in primiparous crossbred dairy cows.

### MATERIALS AND METHODS

The study was conducted on 36 pregnant heifers belonging to the crosses of Jersey, Holstein-Friesian and Hariana maintained at Indian Veterinary Research Institute's Cattle and Buffalo Farm from 90, 60 and 30 days prior to expected date of calving till 150 days postpartum. The animals were selected on the basis of similarity in age and body weight. They were then divided randomly into 3 groups as and when available according to their pregnancy date. All the

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Table 1. Details of feeding periods of experimental animals

Group No.	Feeding period in days (before calving)	No. of animals	Concentrate offered (kg) per day per head						Total amount of extra concentrate fed (kg)
			3 months before calving		2 months before calving		1 month before calving		
			M (kg)	E (kg)	M (kg)	E (kg)	M (kg)	E (kg)	
1	90	12	2.5	0.5	2.5	0.5	2.5	1.0	60
2	60	12	2.5	-	2.5	1.0	2.5	1.0	60
3	30	12	2.5	-	2.5	-	2.5	2.0	60

M= Maintenance and E= extra.

experimental animals were maintained under loose housing and group management systems. They were fed *ad lib.* green fodder in both prepartum and postpartum. The dry matter and crude protein content of fodder and concentrate ranged from 13–16, 6–14, 88–92 and 18.29–18.92% respectively. The details of prepartum concentrate feeding are given in Table 1. After parturition, all the animals were fed 2 kg concentrate as maintenance ration. In addition to that, 1 kg ration was given for every 2.5 kg milk production. Before and after calving they were fed individually after tying inside the milking byre and were allowed to drink *ad lib.* clean and fresh drinking water during 24 hr throughout experimental periods.

Milk yield up to 150 days of lactation, peak yield and days taken to attain peak yield were recorded. Milk constituents viz. fat, SNF, 4%FCM, lactose, protein, chloride,

differences of milk production between 3 feeding periods were not statistically significant. Foley *et al.* (1972) summarized that the concentrate feeding for last 14 days of pregnancy resulted higher milk production than the feeding of same amount of concentrate for last 60 days of pregnancy. Literature regarding the matter is scanty to compare the study. The longer period of steaming-up for increasing milk yield was recommended by Schwark *et al.* (1971). Saun 1996) and Mantysaari *et al.* (1999) showed that extra feeding from 7–8 months of pregnancy had greater importance for increasing milk production than the feeding of first 6 months of pregnancy. Kale (1984) concluded that the feeding of more than 1 kg concentrate /animal /day during last 2 months pregnancy was not of any added value in terms of subsequent postpartum performance of crossbred heifers, provided *ad*

Table 2. Mean and standard error of various milk production traits of primiparous crossbred cows under different feeding periods

Feeding periods in days (prepartum)	No. of animals	150 days milk yield (kg)		Time taken to attain peak yield (kg)		Peak yield (kg)	
		Mean	SE	Mean	SE	Mean	SE
90	12	1243.3	71.9	23.2	5.7	11.9	0.8
60	12	1019.2	80.3	30.3	5.5	10.2	0.7
30	12	1198.3	75.5	28.6	4.3	11.3	0.9
Overall	36	1153.6	46.0	27.3	2.9	11.1	0.5

casein and titratable acidity were estimated at fortnightly interval. Thus, 150 days total yield of milk constituents were calculated. Finally, the economics was calculated. The data thus generated were analysed using standard statistical technique (Snedecor and Cochran 1967). Duncan's multiple range test was applied to find out the significant difference between 3 feeding periods.

## RESULTS AND DISCUSSIONS

The effect of different prepartum feeding periods on 150 days milk production in primiparous cows are presented in Table 1. The overall 150 days milk production was 1153.6 kg. The milk production in 90, 60 and 30 days feeding groups were 1243.3, 1019.2 and 1198.3 kg respectively. But, the

*lib.* green fodder was available.

The overall time taken to attain peak yield was 27.3 days. Ninety days prepartum feeding animals took lowest time to attain peak yield whereas 30 days group animals took almost similar time. The overall peak yield under different feeding periods was 11.1 kg. The peak yield was highest in 90 days group and lowest in 60 days group. Both the cases, the differences were not statistically significant between 3 feeding periods. However, no worker has compared the effect of different prepartum feeding periods by offering same amount of additional concentrate on time taken to attain peak yield and peak yield. According to the experiment of Kale (1984) peak yield was higher in high feeding level group in last months of pregnancy but the difference of peak yield was not significant between the levels.

Table 3. Effect of various prepartum periods on the yields of different milk constituents in primiparous crossbred cows

Feeding periods in days (prepartum)	No. of animals	Total yields (kg)							
		Fat	SNF	4%FCM	Protein	Lactose	Chloride	Titrateable acidity	Casein
90	12	48.19	104.48	1220.16	41.06	54.69	1.14	1.55	32.68
60	12	42.32	84.84	1042.47	35.27	44.58	0.92	1.26	26.35
30	12	47.03	100.03	1184.76	39.82	52.04	1.08	1.49	31.65
Overall	36	45.85	96.45	1149.13	38.71	50.44	1.05	1.43	30.23s

The effect of various prepartum feeding periods on the yields of different milk constituents in primiparous cows are presented in Table 3. The overall fat yield in 150 days of lactation was 45.85 kg. Ninety days feeding animals produced highest followed by 30 days feeding group. The lowest fat yield was in 60 days feeding group which might be due to the lower milk production over 150 days of lactation. The difference of total fat yield was not significant. Reference in the literature regarding the effect of prepartum feeding periods offering same extra amount of concentrate on the fat yield was not available to compare the study. Foot *et al.* (1963), Davenport and Rakes (1969) and Usmani and Inskip reported that high level of concentrate feeding before calving significantly increased the fat per cent of milk in the subsequent lactation. According to the experiment of Gardner (1969), the effect of prepartum feeding levels on milk fat content in cows were not significant. In contrast to their result, Schmidt and Schultz (1959), Broster and Tuck (1967) and Spiekers *et al.* (1991) could not obtain any effect of prepartum feeding on fat per cent of cows.

Table 3 represents the overall SNF yield in 150 days of lactation under different feeding periods was 96.45 kg. The animals of 90 days feeding period had highest SNF yield than other 2 groups. But, the difference was not significant. Reference in the literature is lacking to compare the study. The experiment of Foot *et al.* (1963) and Strickland and Broster (1981) showed that high level of concentrate feeding before calving increased the SNF yield in milk, whereas Broster *et al.* (1978) and Bezenko and Kalinin (1985) found no marked difference among various level of concentrate feeding before calving on SNF yield.

The overall 4% FCM, milk production, lactose, chloride, titrateable acidity and casein yield during 150 days of lactation was 1149.13, 38.71, 50.44, 1.05, 1.43 and 30.23 kg respectively. The highest yield of all the milk constituents was found in 90 days feeding group followed by 30 and 60 days feeding groups which might be due to the highest milk yield in 90 days group. However, in no case, the total yield of milk constituents did not differ significantly between 3 periods. No literature is available to compare the effect of different feeding periods on the total yields of milk constituents.

Since the amount and composition of concentrate in 3

feeding groups were same, the cost of feeding in 3 groups were almost similar. So, the cost of feeding did not influence the overall cost of production. The total manpower requirement per animal was also almost similar in 3 groups and it did not increase the cost of milk production. From the experiment it was cleared that extra concentrate feeding before 90 days of calving had more beneficial effect on subsequent production than the same amount of concentrate feeding before 30 and 60 days of calving in primiparous crossbred dairy cows.

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